15 Years CUTEC: Our Story of Success

CUTEC NEWS

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15 Years CUTEC: A word of congratulation from the Prime Minister of Lower Saxony, Christian Wulff

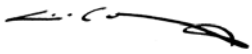
Christian Wulff

On behalf of the Government of the Federal State of Lower Saxony, I wish to thank the CUTEC Institute and all of its employees for 15 years of successful work and extend my cordial congratulations on the occasion of the Institute's 15-year anniversary.

In 1990, professors at the Technical University of Clausthal were toying with the idea of concentrating the results of basics-oriented research work in the field of environmental engineering. Thus, university research and development projects with express emphasis on practical applications have been continued and extended with the objective of generating products and operational patterns for industry and society.

Now and in the future, a tremendous challenge for achieving economical operation is to ensure the efficient utilisation of available and exploited material and energetic resources, as well as to minimise emissions. The solutions derived by CUTEC on an interdisciplinary basis in the fields of environmental and power engineering are highly successful examples for the application of this maxim. In this process, CUTEC has also developed into a complex scientific service institute which profitably cooperates with business and industry, universities, and administration, especially in Lower Saxony. An outstanding feature is the engagement with the Fuel Cell Initiative in the Federal State of Lower Saxony within the Harz Competence Cluster, which will boost innovation efforts on this sector in Lower Saxony.

The applications-oriented research, "made in Lower Saxony", as a connecting link between basic scientific research and industrial product and process development, is well known beyond the borders of Lower Saxony, both nationally and, to an increasing extent, internationally. This work has gained increasing recognition from research partners and clients, and this is reflected by the impressive economic development of the CUTEC Institute. Keep up the good work!



Christian Wulff
Prime Minister of Lower Saxony

IN THIS ISSUE

We look forward to the future

CUTEC celebrated its 15-year founding anniversary on 28th March 2005

Professor Otto Carlowitz

Dear reader,

In this anniversary issue of CUTEC-News, I wish to extend my greetings on the occasion of the 15-year founding anniversary of CUTEC-Institut GmbH. The company's history can be roughly subdivided into three phases of approximately equal length. It is well worth recalling that the CUTEC departments were accommodated at various Institutes of the University during the implementation

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We look forward to the future

phase (1990 to 1995), and that the research work was also performed there. The period from 1995 to 2000 can be designated as the establishment phase, since we moved into the brand-new CUTEC Building in July 1995. A phase of reorientation began in 2000, in conjunction with increased acquisition of third-party funds, which have provided personnel and economic support for the company. The most recent evaluation has also confirmed that CUTEC is on the right track and is well oriented toward the future.

For some 15 years, we have been working successfully in the field of environmental and power engineering. We have been generating and marketing innovations, "made in Lower Saxony", with the aim of maintaining the quality of life in the future by saving resources and energy. What will the future bring? This is difficult to predict in detail. A vital objective is to ensure the availability of future-oriented technology, especially for our country and for our economy, in conjunction with the necessity of providing job security. As we see it, our purpose is to be active in this field. The question of stationary and mobile power supply will certainly be of vital importance in the future, with due consideration of renewable energy sources. In this context, I wish to recall the drastic increase in the price of crude oil. Questions concerning material resources will also receive much more attention in view of the situation on the world market. Just think of the sudden increase in the price of steel scrap in 2004. In this respect, Clausthal – that is, the Technical University and CUTEC – offers considerable potential.

Hence, let us invest all of our efforts in shaping the future. On behalf of CUTEC, I can say: We look forward to the future with optimism.

Yours,

Otto Carlowitz

Congratulations

A word of congratulation from MARTIN GmbH für Umwelt- und Energietechnik

Johannes Martin, Managing director
MARTIN GmbH
für Umwelt- und Energietechnik

We wish to extend our congratulations to Clausthaler Umwelttechnik-Institut GmbH (CUTEC) on the occasion of its 15th founding anniversary. As a result of its successful activity, CUTEC has impressively demonstrated that pioneering developmental work is possible on the basis of close cooperation among research, universities, and industry, even in times of scarce public resources.

MARTIN GmbH für Umwelt- und Energietechnik, München, is a medium-sized enterprise which is specialised in the construction of municipal waste incineration plants. The company has been associated with CUTEC since 1992 as a result of extensive cooperation and joint development projects. The cooperation began with the construction of a pilot plant on a semi-industrial scale for thermal waste treatment on the basis of reverse-acting grate firing. Throughout the years, this plant has constituted a sound basis for our development projects. On this occasion, we also wish to express our sincere thanks for the extraordinary service which CUTEC employees have performed in our numerous test campaigns in day-and-night shifts or on week-ends!

During the past 13 years, much has been accomplished jointly. For instance, pioneering improvements in conventional combustion technology have been achieved with the further development of SYNCOM and SYNCOM®-Plus technology. The residual emissions from such waste incineration plants are decidedly lower than the world's most stringent emission guidelines, and the remaining residues are sintered to yield granulates whose eluate values satisfy all European requirements on inert materials. The specification of the German Federal Government on waste management without landfills as of 2020 thus appears much more feasible with the application of this process.

Our company will continue counting on the support and competence of CUTEC in the future, for instance, in developments which will further enhance our market position in Japan. Our Japanese cooperation partner, Mitsubishi Heavy Industries, Ltd., has constructed a pilot plant on its company premises in Yokohama; this plant is nearly identical to the CUTEC plant and thus allows interesting comparisons and even more conclusive results from research. Low-NO_x combustion, destruction of dioxin, and the production of inert ash granulates, with simultaneous utilisation of energy from waste, are only a few key words which can be mentioned here.

We wish CUTEC the best of success and the best of luck in the selection of projects in the future, too. May environmental engineering continue to constitute the core of strategic competence and the focal point of company development!

Johannes Martin
MARTIN GmbH für Umwelt-
und Energietechnik, München

Do you still remember how it all began?

Gerda Vollbrecht, authorised clerk from 1990 to 2000

About the author: As business manager and authorised clerk, Gerda Vollbrecht has been decisively involved in the destiny of the CUTEC Institute for 10 years and has supported the managing director as well as the staff with competent administration.

CUTEC-Institut was established with the signing of the partnership agreement on 28th March 1990. However, the initiative for the establishment of the company had already begun in 1985. At that time, Prof. Dr.-Ing. Kurt Leschonski, the later founding director of the CUTEC Institute, was rector at the Technical University of Clausthal and noticed that many of his fellow professors were active in fields of research which were ultimately related to environmental engineering in a definite way. The necessity of concentrating these research activities under a single roof was obvious, since the professors' teaching and research obligations demanded their continued presence at their own specialised institutes. An effort to establish a scientific institute with the possibility of performing research work on an interdisciplinary, applications-oriented basis in the field of environmental engineering had to be initiated. In 1988, Prof. Leschonski finally submitted a well-founded application to the German Federal State of Lower Saxony on behalf of Professors Schwedt, Jeschar, Scholz, Vogelpohl, and Lux. The application included the equipment plans, a basic personnel roster with 45 employees, and a proposal for the construction of an environmental engineering institute building for about 100 employees at a cost of 45 000 000 DM. The Lower Saxon Government appointed a founding commission, which recommended the acceptance of the application after examination of the concept. In view of the extraordinarily applications- and practice-oriented fields of activity, the responsible ministry specified the legal form of a limited liability company doing business under the name "Clausthaler Umwelttechnik-Institut GmbH (CUTEC-Institut)" as the most appropriate solution.

In this research institution external to the university, the shares are held exclusively by the Federal State of Lower Saxony. (At that time, the responsible ministry was the Lower Saxon Ministry of the Economy, Technology, and Traffic; since 1990 the Lower Saxon Ministry of Science and Culture is responsible.) The Director of the Institute of Particle Technology and Environmental Process Engineering at the Technical University of Clausthal, Professor Dr.-Ing. Kurt Leschonski, was appointed extra-officially as managing director. Since the establishment of CUTEC-Institut, the individual, specialised departments have been working together on an interdisciplinary basis in the execution of research projects and investigations. They have been – and still are – jointly active in the analysis of complex case structures. From the very beginning, the company has cooperated closely with the Technical University of Clausthal. A cooperative agreement was signed in August 1991; scientific cooperation could thus begin.

Thanks to the cooperative agreement with the Technical University of Clausthal, adequate possibilities for performing research work were available at scientific facilities of the University. The professors who were initiating the founding application were already active there, and the facilities could be employed until completion of the new institute building which had been promised by the Federal State of Lower Saxony. As of 1990, the Federal State granted financial support for recruiting a few scientific, technical, and administrative employees; the latter were then accommodated in rented space. At the same time, the architects and consulting engineers were commissioned with the preparation of the documents for the building proposal on the basis of the concepts submitted by CUTEC-Institut, which was subject to all obligations of a building

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Helga Schuchardt (left, Minister of Science and Culture in Lower Saxony from 1990 to 1998) and the architect, Mr Husemann, at the corner stone laying ceremony for CUTEC

in memoriam: Professor Dr.-Ing. Dr.-Ing. E.h. Kurt Leschonski

Prof. Dr.-Ing. Dr.-Ing. E.h. Kurt Leschonski (1930 – 2002)

Prof. Kurt Leschonski's work was decisive in forming the profile of CUTEC with a high level of scientific competence. His active engagement for the region and his humanitarian qualities will never be forgotten.

After completing his studies in mechanical engineering at the Technical College in Braunschweig, he earned his doctor's degree at the Technical College (TH) in Karlsruhe in 1965. After serving as Oberingenieur (chief engineer) for several years, he was appointed to the post of professor for particle technology at the Technical University of Clausthal in 1971. Despite three appointments, including one abroad, he remained true to the University until his retirement. From 1983 to 1987 he served as Prorector and Rector at the Technical University of Clausthal. During this period, he laid the professional foundation for the establishment of CUTEC with the establishment of the Research Association for Environmental Engineering, which was joined by two-thirds of all professors at Clausthal.

His research activities in the field of particle technology were manifold. Particle sizing technology was at the very core of his work. The success of his research efforts is demonstrated by 22 doctoral candidates, 25 patents, and 170 publications. He was honoured many times at home and abroad for his scientific achievements. For his life's work, he received the Bundesverdienstkreuz, 1st class (an order awarded by the Federal Republic of Germany), in 1997.

As Managing Director, Prof. Leschonski decisively determined the destiny of the company from 1990 to 2000. (he/wes)

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Do you still remember how it all began?

sponsor. NILEG was in charge of the project coordination. Finally, Lower Saxony pledged to provide funds in the amount of 33 000 000 DM for construction of the new building and 12 000 000 DM for the initial equipment.

During the interim, the building proposal had been approved, the plot of land with an area of 20 000 m^2 located in the domain of the University had been purchased from the Federal State of Lower Saxony at the regular estimated price, all contracts with the architects and consulting engineers had been prepared and were open for signature, and the Europe-wide tender could begin. Although the cost of construction had been carefully calculated, the building prices had literally exploded prior to the opening of tenders: 8 000 000 DM was lacking. For Professor Leschonski and Dipl.-Ing. Werner Siemers, who advised and supported the managing director in performing his duties as building sponsor, it was a point of honour to ensure that CUTEC-Institut GmbH could manage with the approved 45 000 000 DM. Together with the architect, Mr Husemann, and the consulting engineers, they succeeded in limiting the cost of construction to 35 000 000 DM, especially by sacrificing the building for the custodian as well as several hundred square metres of floor space, by scaling down the demands on ecological equipment, and finally by sacrificing 2 000 000 DM, which had originally been necessary for initial equipment. (In this context, it is worth mentioning that the final account, which was submitted to the Regional Government in Braunschweig, amounted to just about 45 000 000 DM. Moreover, the planned schedule for occupation on 31st December 1994 was observed to the day.)

Hinrich Swieter, Minister of Finance in Lower Saxony from 1990 to 1996, delivered the formal address during the topping-out ceremony at CUTEC in December 1993

Prof. Leschonski (right) with the German Chancellor, Gerhard Schröder (left, Prime Minister of Lower Saxony at the time) at the dedication of the new CUTEC building in July 1995

Because of the structure defined in conjunction with the company's establishment, the scientific managers of the institute departments had to be accommodated under an organisational form designated as a Board of Directors. Under the terms of the partnership agreement, moreover, these scientific managers had to be professors at the Technical University of Clausthal. The special functions of the Board of Directors included counseling the company management in all scientific matters and ensuring interdisciplinary cooperation among the departments of the Institute. The chairman of the Board of Directors was the managing director, who also summoned the executives to attend weekly meetings and to report on the progress of their work. Thus, all necessary information paths converged in Prof. Leschonski's office. Despite the initial seven and later ten different locations of employee activity, the managing director was thus capable of accomplishing the management and control functions for which he was responsible. In performing these tasks, he was accompanied by an engaged Scientific Advisory Board as well as an attentive and fair Board of Directors.

On 15th December 1994, the Management, EDP, and Public Relations Departments moved into the new building, and their leases were terminated as of 31st December 1994. They were followed immediately by the Department of Process and Environmental Analysis and, over the next few months, by the remaining scientific research departments which had been accommodated in various university buildings. After disassembly and reassembly of its elaborate research facilities, the Department of Thermal Processes also completed its move in mid-1996, and the new building was thus completely occupied and operative.

Of course, there was ample opportunity to celebrate, too. The architecturally outstanding institute building with its excellent infrastructure was the object of considerable interest among the local citizens, who had the opportunity to visit the company premises during an open house, the members of the University, and the political public. Before the official dedication ceremony in July 1995, Gerhard Schröder, the Prime Minister of Lower Saxony at the time, had selected CUTEC-Institut for the 1994 Niedersachsenpreis, which was awarded in May 1995.

Because of its immediate significance, an outstanding event for the personnel at CUTEC-Institut and at the University was the groundbreaking ceremony in September 1992 with Professor Knissel, the Rector of the Technical University of Clausthal at the time, the architect, Mr Husemann, and the Managing Director, Professor Leschonski. The corner stone was laid by the Minister of Science and Culture (Mrs Helga Schuchardt) in May 1993; the topping-out ceremony took place in December 1993 and was attended by Minister of Finance Swieter.

During a period of four months, CUTEC presented the Expo project "Sustainable Waste Treatment" in Clausthal-Zellerfeld in 2000.

Lower Saxony's Prime Minister Gerhard Schröder did not miss the opportunity to highlight the dedication ceremony with a remarkable speech on the subject of environmental technology in the presence of an illustrious assembly of guests in July 1995.

The cooperation among all departments proved to be extraordinarily successful from the very beginning. Professor Leschonski had an amazing ability to reach

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Do you still remember how it all began?

the correct decision in the selection of personnel. Highly competent employees dedicated to their work ensured the efficient performance of all Institute activities, not only in the operative fields of business, and have contributed decisively to the good reputation which CUTEC-Institut has acquired. With the start of operation at the Institute building, excellent working conditions and job security provided some fifty employees with an optimal basis for interdisciplinary research work. The university professors who constituted the Board of Directors had been intensively engaged during the establishment phase. With the personal and occupational development of the young scientific employees, however, the professors could progressively transfer many duties and functions to the new personnel.

Of course, the execution of orders for research and investigation, as well as the Institute's own contributions to major scientific conferences and symposia, have always received priority; nevertheless, other interesting and worthwhile problems had to be solved, too. For instance, the project, "Sustainable Waste Treatment", on the occasion of EXPO 2000 has received due recognition. The execution of this project required about four months and was highly successful. The exhibits, guided tours, and lecture series within the CUTEC-Institut have been the subject of broad public interest.

Prof. Leschonski (at the reading desk) during the colloquium held on the occasion of his retirement in 2000

Professor Leschonski received emeritus status upon reaching the age of 69 on 31st March 1999. The time had come to find a successor for the position of Managing Director, and again he also had to be a professor at the Technical University of Clausthal. In a joint application procedure between the University and CUTEC-Institut, Professor Dr.-Ing. Otto Carlowitz was nominated and subsequently appointed to the post of Managing Director at CUTEC-Institut, effective as of 1st April 2000, in mutual agreement with the Technical University of Clausthal. Thus, Professor Leschonski could entrust his life's work to his successor with confidence. On the occasion of the retirement ceremony for Professor Leschonski in the lecture hall of his CUTEC-Institut on 30th June 1999, his accomplishments were acknowledged by representatives from the Federal State of Lower Saxony as well as by his colleagues. With great pleasure, Professor Leschonski then observed the highly promising continuing developments at CUTEC-Institut under the leadership of its new Managing Director. Professor Leschonski passed away on 21st March 2002 at the age of 71. The 15-year founding anniversary would have offered him an excellent opportunity to review the evolution and realisation of a magnificent idea. (vo)

The original pioneers

Congratulations to the staff on their 15-year jubilee

He who has no vision can neither fulfil high hopes
nor realise big projects.
Thomas Woodrow Wilson (1856 - 1924)

Of course, we had visions, wishes, and hopes when our CUTEC adventure began over 15 years ago. An adventure – yes, it was indeed an adventure at the beginning, – but it was also a splendid and unique opportunity to create and design something new.

15 years CUTEC – The original personnel celebrate their jubilee

It all began in several rooms at Leibnizstraße 19, which had been placed at CUTEC's disposal by the Institute of Particle Technology. The initial CUTEC personnel was accommodated here and were responsible for establishing the Finance, Personnel, EDP, and Purchasing Departments under the direction of Mrs Gerda Vollbrecht, later an authorised clerk, and Werner Siemers. The scientific personnel conducted their research activities under the coordination of Prof. Kurt Leschonski at the institutes of the founding directors.

It quickly became evident that the accommodations at Leibnizstraße 19 were only a temporary solution because of the limited floor space, which already necessitated a search for new quarters in the autumn of 1990. Unfortunately, it was not possible to find sufficient space in a single building – especially since further departments, such as Public Relations as well as Designing and Planning, had been added to the "CUTEC-Team", which was then supported by their work. Thus, our team was forced to separate after such a short time – even though this separation was a purely spatial matter.

CUTEC's new locations were now rented rooms at the Bergbauberufsgenossenschaft (Miners' Liability Insurance Association) for the Management Department, at the hotel "Goldene Krone" for the Public Relations Department, and at the former hotel "Stadt London" for the EDP as well as Design and Planning Departments. Here, and of course at the research institutes too, the "CUTEC vision" continued to be pursued – in spite of the spatial separation and the associated disadvantages – , until the realisation of this vision with the move into the new CUTEC building four years later. (ws)

On the occasion of the founding anniversary, the editors wish to congratulate the original pioneers who have constantly given their best for CUTEC:

Heike Eberhardt (8); Karin Hoffmann (5); Michael Röneke (4); Dipl.-Ing. Werner Siemers (3); Dr.-Ing. Michael Sievers (1); Birgit Stein (6); Volker Wessels (2); Wolfgang Wieczorek (7); Dr. rer. nat. Torsten Zeller (9)

Congratulations from the Technical University of Clausthal (TUC)

A word of congratulation from Prof. Dr. Edmund Brandt, President of the Technical University of Clausthal

Prof. Dr. E. Brandt
President of the TUC

Dear Professor Carlowitz,
dear employees at CUTEC,

On the occasion of the fifteenth founding anniversary of Clausthaler Umwelttechnik-Institut GmbH (CUTEC), I want to extend my sincere best wishes on your jubilee.

Historically, CUTEC and the Technical University of Clausthal have evolved from common roots. As early as 1986, the University Senate decided to establish a research association in the field of environmental engineering. The objectives were to concentrate the environmental knowledge and experience which are available at the institutes of the University and to continue their development by applications-oriented research for the generation of corresponding products in a subsequent step. In the following years, the functions of the research association steadily gained importance for all concerned. Consequently, Clausthaler Umwelttechnik-Institut GmbH was established on the initiative of the professors at Clausthal in 1990 with the aim of promoting applications-oriented scientific research in the field of environmental engineering.

Today, as in the past, the two institutions cooperate very closely, complement one another by corresponding orientation of research, and successfully utilise synergistic effects: At the Technical University of Clausthal, the effort is devoted primarily to basic research, whereas the priority at CUTEC is in the field of applications-oriented research and development between basic research at universities and industrial product development in the fields of environmental and power engineering. The University's Institute for Environmental Sciences (IUW), which is accommodated at CUTEC and whose director is simultaneously the Managing Director at CUTEC, functions as a bridge between the two institutions. Cooperation is actively experienced by joint research projects (such as Energiepark Clausthal), as well as term papers, diplom theses, and doctoral dissertations. For this purpose, the spatial proximity of the two institutions has also proved to be a great advantage for efficiently and expediently utilising the resources which are jointly available in Clausthal.

I wish you the very best for the future of your company and many years of continued cooperation for us both.

Yours sincerely,

Prof. Dr. E. Brandt

A word of congratulation from Prof. Dr.-Ing. Hans-Peter Beck

Chairman of the Scientific Advisory Board at CUTEC

Prof. Dr.-Ing. H.-P. Beck
Chairman of the Scientific Advisory Board at CUTEC

Dear Professor Carlowitz,
dear employees at CUTEC-Institut,

I wish to congratulate you on the occasion of the fifteenth founding anniversary of your institute. I am pleased to observe that a research institution which has originated from the Technical University of Clausthal on the initiative of Prof. Leschonski, deceased during the interim, and which continues to cooperate closely with the University today, has found its place between the University and industry, that is, applications-oriented research and development in the fields of environmental and power engineering.

As chairman of the Scientific Advisory Board, which is concerned primarily with questions of strategic and scientific orientation at CUTEC, I am actively engaged in the development of the Institute and wish you and myself that the steady positive development will continue for a long time to come.

Sincerely,

Prof. Dr.-Ing. H.-P. Beck

Institute for Environmental Sciences *Instruction and Research*

The establishment of the Institute for Environmental Sciences (IUW) and the initial filling of the professional chair with the appointment of Prof. Dr.-Ing. Otto Carlowitz on 1st April 2000 reflect the close contact between CUTEC-Institut GmbH and the Technical University of Clausthal.

Tomorrow's scientists – curious "experts" at CUTEC during the TUC information sessions for school pupils

The IUW regards itself as a connecting link between the predominantly applications-oriented research and development at CUTEC and the basic research at the University. Besides the courses of instruction, a major field of activity at IUW is the treatment or purification of exhaust gas and exhaust air from production and waste treatment processes, including recycling of materials, energetic optimising, as well as minimising the emission of residual contaminants. The investigation of reformer systems for fuel cells as well as the measurement and evaluation of emissions are also conducted at the institute. Further information is available at the secretary's office of the IUW or under www.iuw.tu-clausthal.de. (ne)

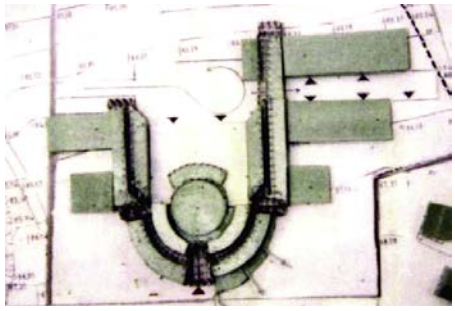
From a mountain meadow to a modern research institute

Evolution and construction of the Institute building

Dipl.-Ing. W. Siemers

One of the first tasks with which CUTEC-Institut GmbH was confronted during its founding phase was planning of the new institute building. After completion of preliminary work and successful negotiations by Prof. Leschonski, his fellow professors, and Mr. Zimmermann-Kornhardt with the Federal State Government of Lower Saxony concerning the establishment of CUTEC, the first CUTEC employees were recruited as of 1st November 1989. After solving of initial problems, such as office infrastructure and the procurement of chairs, planning of the new building began with the contracting of NILEG for the coordination of construction. After constitution of the building committee, Husemann & Dr. Wiechmann were then selected as architects for the construction at the beginning of 1990. From a total of four different draft options, the "U" for Umwelttechnik (environmental engineering) was then specified as the decisive draft element at the beginning of 1990 (see the figure in the middle). Application had been filed for the specified primary floor space of 4 400 m² in 1988; this value was nearly attained by the architects with just about 4 700 m². The fundamental design elements of the building comprised a semicircular central section for the lecture hall, Management Department, communications, etc., two parallel laboratory wings extending toward the north, and pilot-plant halls arranged at right angles to these. A plot of land with an area of 20 000 m² at the end of Leibnizstraße was specified as construction site. Together with the engineers then contracted with the technical design, a total cost just exceeding 38 000 000 DM was determined. This sum considerably exceeded the total of only 22 000 000 DM originally specified in the building application. As expected, the resulting, necessary negotiations with the Government of Lower Saxony proved to be difficult, especially since a change of government had occurred shortly before; furthermore, a different ministry was now responsible for CUTEC. During the decisive meeting at the Ministry for Science and Culture on 5th October 1990, Prof. Leschonski succeeded in achieving a compromise by virtue of his characteristic ability to assert himself; thus, an upper limit of 33 000 000 DM was specified for the construction costs. A factor which was weighted in favour of CUTEC was the fact that the initially indicated cost of 22 000 000 DM had been derived from obsolete and inappropriate official cost data. The additional amount of 12 000 000 DM from the original planning for equipment was not altered; hence, a total of 45 000 000 DM was now specified as the upper cost limit.

On the basis of this specification, the plans were modified appropriately, the building was somewhat reduced in size on all sides, and the individual cost allocations were optimised. Thus, with the specification of 4 400 m² for the primary floor space, ZBauL was again submitted to the Regional Government, and the building application was submitted to the Administrative District in Goslar in February and April. The building permit was then granted on 19th August 1991. Unfortunately, this was not yet the start signal for the commencement of construction, since the intended financing from structural funds for Lower Saxony had begun to falter as a result of German reunification, and a competition thus arose for the last projects still eligible for financing. Ultimately, Prime Minister Gerhard Schröder decided in the cabinet to include the CUTEC building in the final list of construction projects. However, the negotiations did not come to an end until mid-1992, and so the planning procedures came to a partial stand-still during the interim.



Initial model of the CUTEC Building during the preliminary planning phase

Nonetheless, the tender documents had been completed, and so the general call for tenders could begin after receipt of the positive signals from Hannover. After the submission of bids in June 1992, the next set-back had to be faced: Building costs had exploded, again as a consequence of reunification. The result of the submission exceeded the allocated budget by about 8 000 000 DM. Additional funding was out of the question; therefore, an intensive search for possible cost reductions was unavoidable. Consequently, the building and the technical facilities were again scaled down, and everything which was not immediately necessary was omitted. These cancellations partially explain the bewilderment on the part of new employees, who want to know why something had not been built in a certain way right at the start. Hence, the entire ventilation system for the pilot-plant halls, the basement underneath the covered goods-receiving area, the custodian's lodge, and several other items were omitted. Moreover, financial negotiations were conducted with the companies concerned. Thus, the actual construction work finally began at the end of 1992, after the ultimate approval of the total funds by the Regional Government on 24th August 1992. Especially during this phase, CUTEC profited from the background activity of NILEG, which had appointed Mr Düwel – an unrelenting cost watcher – as project coordinator.

Finally, on 14th September 1992, the big day had arrived. The groundbreaking ceremony took place in the Harz Mountain fog on hitherto untouched meadow land. In the afternoon, the first excavators then arrived at the scene, and the earth-moving operations began. After solving of the financial problems for the present, the next hurdle to be faced was the Harz Mountain weather. During the first

Groundbreaking ceremony in the Harz Mountain fog

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From a mountain meadow to a modern research institute

year of construction, an extended winter break was unavoidable, since the winter of 1992/93 proved to be especially long and cold. Nevertheless, Adam, the contracted company, started construction at the beginning of 1993. In the course of this process, the building was constructed essentially in reverse. After laying of the ground piping and underfloor ducts, the concrete was first poured for the two pilot-plant halls. Subsequently, construction of the laboratory unit (section C) began. At the same time, the steel framework for the pilot-plant halls was erected. Thus, the corner stone was laid by Minister Helga Schuchardt, the architect Mr Husemann, and Prof. Leschonski on 18th May 1993, but this time the spring weather was splendid, and the ceremony was conducted in the nearly completed yellow steel structure of the pilot-plant halls.

The carcass work then continued to section B, the semicircular front block, all the way to section A, which is a shortened

The structure shortly before completion in the summer of 1994

laboratory wing. The topping-out ceremony took place upon completion of the final concrete ceiling over the east stairwell on 3rd December 1993. This time, the guest of honour was the Minister of Finance, Hinrich Swieter, with the typical foggy Harz Mountain weather as a backdrop. Because of the inclement weather phases, complete closure of the structure was not possible before the coming of winter in 1993; consequently, the interior work did not really commence until the beginning of 1994. The most active phase of construction occurred during 1994, since the carcass work was still in progress in section A, on the one hand, whereas completion, including all interior work and installation of technical facilities, was already in progress in the pilot-plant halls and laboratory unit. Numerous anecdotes have originated during this stage of construction, but these are beyond the scope of the present article. This period was also characterised by strict scheduling and cost management, which demanded a high level of coordination and sympathetic understanding.

Besides the new building, a portion of the equipment likewise had to be procured. A part of the available total of 12 000 000 DM had already been spent for the scientific departments during the founding years. In 1994, furniture, workshop facilities, and shelving, among other items, now had to be acquired. For this purpose, as well as for building coordination, Mr Siemers received support from Mr Sibbe as of the end of 1993.

At the end of December, the first employees moved into the nearly finished building, especially into the laboratory unit and management block. At other locations, construction work was still in progress, or nonconformities were being corrected. Finally, on 17th July 1995, the CUTEC Building was dedicated in an official ceremony. The Prime Minister of the Federal State of Lower Saxony at the time, Gerhard Schröder, handed an oversized key to Prof. Leschonski as Managing Director, after having received the key from the architect. However, the work did not end with the dedication. The technical facilities were transferred step-by-step, residual work was completed, instructions were provided, and the operation of the Institute started. The final account still had to be settled. The total cost of the new building amounted to just about 35 700 000 DM. The difference between this sum and the planned construction costs of 33 000 000 DM was compensated from the equipment budget with the approval of the funding bodies. As a whole, the upper cost limit of 45 000 000 DM as well as the specified primary floor space of 4 315 m² were observed exactly. Thus, a brand-new building with total floor space of almost 10 000 m² was available to CUTEC for establishing its operations.

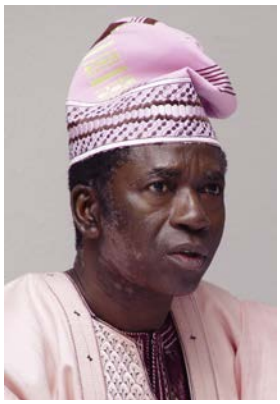
Model of the present building

Nevertheless, it soon became obvious that the available floor space was limited, especially for pilot plants and storage facilities, partially as a result of the aforementioned cost reduction measures. Because of a fortunate combination of circumstances, however, it was possible to obtain additional funds from the Federal State of Lower Saxony for the construction of a further pilot-plant and storage hall. An upper cost limit of 2 000 000 DM was specified for this structure. With this sum at their disposal, the experienced team consisting of the architect, engineers, and the "CUTEC construction personnel", Siemers and Sibbe, constructed a hall with some 1 000 m² as an extension to the two existing pilot-plant halls with 855 m² of primary floor space. As usual, winter weather set in soon after the beginning of construction at the end of 2000; consequently, the new hall was not completed until shortly before the end of 2001. Since the beginning of 2002, the hall has been subject to intensive use. Thus, the CUTEC Building as a whole has become somewhat asymmetric, as shown in the above figure. The 'U' for Umwelttechnik, which was clearly visible in the initial plans, has been somewhat distorted and has received "hooks" on one side. In conclusion, it should be emphasised that the building provides excellent working conditions for the CUTEC personnel as a whole, and that it creates a good overall impression in spite of all cost-reduction measures. (si)

The new building in figures

Primary floor space	4 315 m²,	of this total, 2 480 m² for laboratories and pilot plants
Subsidiary floor space	1 123 m²,	such as storage areas
Functional areas	913 m²,	such as for technical facilities
Traffic areas	2 210 m²,	corridors, traffic areas, partially employed for pilot plants at present
Overall floor space	9 660 m²	
Settled construction cost	35 700 000 DM	
Of this total:	10 000 000 DM	carcass work
	9 000 000 DM	interior work
	8 000 000 DM	technical and service facilities
	2 000 000 DM	exterior facilities and connections
	600 000 DM	building ground, planning and development
	6 000 000 DM	professional fees, charges, incidental expenses

Word of congratulation from the Nigerian ambassador, Professor Tunde Adeniran



Prof. Dr. T. Adeniran

CONGRATULATIONS

I write to bring to you fraternal greetings on behalf of the Government of the Federal Republic of Nigeria on the occasion of the celebration of 15th anniversary of the establishment of your institute. The global recognition you have earned within the short period of your existence is the acknowledgement of the stride you have made in the area of environmental technology. It is also a testimony of the legendary efficiency which has become the hallmark of German institutions.

I am particularly impressed by the vision of your company which places emphasis on development and enhancement of local content, transfer of technology, manpower development through on- the- job and in- house training, -as well as exchange programmes.

Your laudable vision would no doubt be of benefit to my country as we struggle to contain environmental degradation and pollution. As you are aware, Nigeria presently suffers unacceptable level of environmental pollution which has obvious implications for the health of our citizens. I am delighted that you are going into Nigeria at this stage of our development. It would afford us the opportunity to learn from the mistakes of the developed countries in not taking environmental issues seriously in the earlier stages of their development.

I wish to use this occasion of your anniversary to call for renewed and deepening of collaborative efforts already existing between Nigeria and CUTEC- Institut to create sustainable friendly environment for economic and social development of the country.

Once again, congratulations on your well deserved anniversary. I look forward to continued fruitful relationship with my country in the years to come as we endeavour to create conducive environment for humankind.

CUTEC shows its colours, nationally and internationally

From the company's presence at international industrial fairs all the way to the company forum in the region

"After all, I'm not stupid" and "Avarice is super" are two well-known advertising slogans from current radio and television commercials. For recipients of the advertising messages, the intended association with two leading suppliers of entertainment electronic appliances is obvious.

I doubt whether our company will achieve this level of popularity in the foreseeable future. Nevertheless, it is every bit as vital for our Institute to ensure that our potential customers are expressly aware of our presence as a competent partner for solutions and innovations in the fields of environmental and power engineering. For this purpose, it essentially makes no difference whether we demonstrate this presence at a regional event – such as the Clausthaler Wirtschaftsforum – or at an internationally recognised industrial fair – such as IFAT 2005 or ACHEMA 2006 – with a high share of specialists among the visiting public. In the latter case, of course, the distances involved as well as the necessary effort on our part are greater, and the associated costs are higher. For this part of our public relations work, we have our own stand equipment for maximising our flexibility on site and an experienced exhibition team for organising and conducting our participation in industrial fairs. Presentations outside of Europe are realised by sharing a stand with others or by rental of ready-made stands, which are occupied by our specialised personnel.

Interesting discussions, technical innovations, and an inviting atmosphere attract guests to the CUTEC stand during an industrial fair

Information on our operative fields of business as well as projects already executed is now constantly available from the Internet – albeit only in German at present. In this context, our Institute can be contacted at any time through the aforementioned specialist partners. The new CUTEC Image Film and the Institute Report from 2000 to 2003, which was published during the past year, are equally informative; both are available on request for your information. If you wish to discuss your problem face-to-face with our specialists, feel free to visit us at ACHEMA 2006 in Frankfurt. We hope to see you there!

See you soon! (he)

A welcome guest at our stand: an outstanding political figure from Lower Saxony – Minister of the Environment Sander (r.) speaking with Mr Siemers

The whole is more than the sum of its parts

A brief description of all departments and their interdisciplinary cooperation

In the present article, all department heads at our Institute present a brief description of their departments and special fields of research as individual parts, whose sum constitutes CUTEC as a whole. As a result of the active interdisciplinary cooperation within the Institute, synergistic effects often occur during the execution of research orders and projects. Consequently, the whole – our CUTEC – is more than just the sum of its parts. Historically, this conclusion is attributed to Aristoteles (384 to 322 BC), a famous Greek philosopher and natural scientist of the Occident.

Dr.-Ing.
M. Sievers

Department of Physical and Biological Processes

The chain of key words, waste water – waste – soil, outlines a part of the currently expanding activities in the fields of biogas generation from renewable raw materials, as well as recycling and re-use of industrial process water. Newly developed processes comprising various physical, biological, and chemical unit operations are applied with the objective of saving resources and minimising energy consumption. These objectives are pursued with industrial production processes as well as in plants for reducing emissions. Two developments, the process for increasing the yield of biogas as well as the reactor for improving sludge dewatering, are almost ready for commercialization. Further developments are in progress. A particularly significant feature is the increasing international activity of the department, since topics such as water, waste, and biogas are of special interest world-wide. This trend is demonstrated by the increasing cooperation with countries in Europe and overseas, as well as the intensification of international cooperation as a whole. Questions on biogas utilisation (gas treatment / utilisation, energy management) are currently being investigated particularly on an interdisciplinary basis among various departments in CUTEC. (siev)

Dr.-Ing.
S. Vodegel

Department of Thermal Processes

Die Abteilung Ther- The Department of Thermal Processes (TP) is concerned with research topics in the fields of pyrolysis, gasification, and combustion, especially of solids. These substances include residues from which energy is obtained (key word: waste to energy), materials to be recycled (key word: recycling of raw materials), or biomass for energetic (key word: input for fuel cells) or material applications (key word: synthesis of fuels). Moreover, the department maintains a mobile measuring team which is an approved measuring station for the Federal State of Lower Saxony, as specified in § 26 BImSchG. Because of the frequent interdisciplinary questions involved, the department cooperates closely with the other operative departments at CUTEC: With the Department of Chemical Processes in matters of fuel synthesis, with the Department of Modelling and Simulation whenever modelling is necessary, and with the Chemical Analysis Department in connection with the measuring station.

The Department TP is well equipped with pilot plants and thus possesses a sound basis for dealing with social tasks in environmental and power engineering and for providing qualified solutions to such tasks in the future, too. (vd)

Prof. Dr.-Ing.
M. Claußen

Department of Chemical Processes

The R&D activities at the Department of Chemical Processes can be summarised by the following chain of key words: fuels – power trains – emissions. Besides upgrading and designing of liquid fuels from biogenetic and fossil sources, the development of components for fuel cells and the associated systems technology, the topics under investigation include the reduction of emissions from direct-injection internal combustion en-

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Corporate image of CUTEC GmbH

"The whole is more than the sum of its parts"

1. CUTEC is positioned primarily in the field of applications-oriented research and development between basic research at universities, and industrial development.
2. The objective of operations at CUTEC is to generate innovative product solutions and procedural instructions from the results of basic research and to implement these with partners in practice.
3. The work performed at CUTEC comprises the fields of environmental and power engineering. Besides the consideration of new, innovative, or intensified singular processes, the networking concept (systems technology, coupled processes) should be emphasised during research. For this purpose, the work is conducted on an interdisciplinary basis and includes cooperation with competent external specialists as well as the Institute's own contribution in networks.
4. CUTEC pledges to promote the principle of sustainability within the scope of its research activities as well as the special topics under investigation.
5. For assuring the quality of its research work, CUTEC observes the directives and guidelines of the *Deutsche Forschungsgemeinschaft* (German Research Association).
6. CUTEC operates internationally. Nevertheless, the Institute is indebted in a special way to the German Federal State of Lower Saxony, since it is inherently an institution of this federal state. Consequently, a major objective at CUTEC is to contribute correspondingly to the economic strength of Lower Saxony.
7. CUTEC has originated from the Technical University of Clausthal. This origin is reflected by a close association with the University, which is realised by intensive cooperation at all levels of scientific work. CUTEC, too, supports the rising generation of young scientists.
8. All CUTEC employees shall take this corporate image as a basis for their actions.

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The whole is more than the sum of its parts

gines with the use of catalysts. In the course of several nationally and internationally funded R&D projects in the field of "biomass to liquid", which are conducted on an interdisciplinary basis at CUTEC, a newly designed reactor for Fischer-Tropsch synthesis (FTS) has been successfully constructed and put into operation by the Department of Chemical Processes. Nearly isothermal reaction control can be implemented with the installed fixed-bed reactor. As indicated by the results, the conversion as well as the selectivity of the reaction can be controlled to achieve high yields with this approach.

The new FTS reactor is operated in combination with the existing hydroprocessing pilot plant , in which the high-boiling FTS waxes are cracked. Moreover, the fuel fractions thus obtained can be hydrosomerised, and thus adapted and optimised to yield the fuel quality demanded by the automotive industry ("designer fuel"). With the use of the department's own engine test stand, the associated emission behaviour can be appraised. (cl)

Dipl.-Ing. W. Siemers

Joint Project Energy

The experience gained to date with the project, "Energy Park Clausthal", and other projects supported by third-party funds for decentralised energy management should be applied for further projects and research proposals. In this context, special emphasis is placed on activities summarised by the key word "decentralised energy system technology". This term implies the development of concepts involving the use of several types of decentralised technology for the utilisation and networking of conventional as well as renewable energy sources, as well as appropriately balancing the system to match requirements. The overall system can be optimised locally, regionally, or even nationally. Preliminary projects are in progress in Germany, in Europe, and in countries outside of Europe. The services of further competent specialists from the process-engineering departments, as appropriate, will also be necessary for designing an overall system. (si)

Prof. Dr. B. Heins

Environmental Economics, Environmental Law, and Technology Assessment

The political, economic, and social implementation of environmental engineering in our society, as well as delineating and focussing attention on its importance for sustainable growth, constitute the vital functions of this department. Special emphasis is placed on the creation of appropriate general conditions for the application of environmental engineering in the operational fields of human factor – risk management, energy, soil, and process design. With our non-technical point of view, the technical core competence of the CUTEC portfolio is supplemented in an excellent manner. This characteristic feature of CUTEC is unique in Germany.

In our case, the work performed in networks receives particular attention, for instance, in projects such as "Sustainable Malta" or "Phytoextraction": For this purpose, we develop integral concepts or generate research proposals, respectively, in cooperation with other CUTEC departments, or with experts at home and abroad.

We maintain close contact with the institutes of the Technical University of Clausthal; our business relations with the industry are good, and they are constantly being intensified. (kra)

Dr. rer. nat. A. Fischer

Chemical Analysis Department

The Chemical Analysis Department is a partner and consultant for the other CUTEC departments in all questions of inorganic, organic, and especially analytical chemistry. Highly motivated, well-trained, and experienced personnel have at their disposal comprehensive and constantly expanding facilities and equipment for providing the necessary chemical-analytical support for the projects which are in progress at our Institute. For this purpose, of course, procedural steps or even an entire analytical method must frequently be developed. An example of interdisciplinary cooperation is the measuring unit operated jointly by the Department of Thermal Processes and the Chemical Analysis Department, as specified in § 26 of the Bundesimmissionsschutzgesetz (German Federal Law Relating to Protection Against Immissions). However, this department is a competent partner for cooperation with its internal and external customers in other contexts, too. In a number of measurement and development jobs from various fields of private industry, corrosion research is currently of great importance. (fi)

PD Dr.-Ing. M. Reuter

Modelling and Simulation

The primary purposes of the Modelling and Simulation Department are the development and application of software for optimising systems, controls, and processes. Besides the establishment of a qualified personnel staff through research and instruction, its functions include the execution of own projects, the coordination and organisation of international congresses, and the representation of CUTEC profile by offering courses at the Technical University of Clausthal. As a result of its R&D work the department has gained a reputation as an expert in the field of optimising and evaluating metal-detection equipment, supervising work-flows and analysing laser induced signals during the past two years. Within the scope of its internal responsibilities, the department is active in the implementation of joint projects with the Departments of Thermal Processes and Analysis in the field of preventive control as well as the development of online techniques for the detection and identification of special aromatic and nitrogen compounds in soils. (re)

Dipl.-Ing. R.-U. Dietrich

Competence Cluster Harz

Competence Cluster Harz is a shortened expression for Competence Cluster Science and SOFC Development by the Fuel Cell Initiative in the German Federal State of Lower Saxo-

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Continuation from page 11

The whole is more than the sum of its parts

ny'. It is the result of efforts in Lower Saxony to gain a foothold in fuel cell technology, which promises to become firmly established in the future, as well as to create and ensure jobs in the region.

The objectives of the Competence Cluster Harz justify the somewhat lengthy title: to prepare a survey of, to combine, and to extend the research activities in the field of fuel cells in Lower Saxony, on the one hand, and to continue as well as expand the current SOFC activities (SOFC: Solid Oxide Fuel Cell), on the other hand.

As far as the second objective is concerned, the primary task of the Working Division is the successful execution of the SOFC Demonstrator Project for decentralised power applications. This project is described in detail elsewhere in the present issue of CUTEC-News.

In this project, the interdisciplinary approach at CUTEC is pursued especially well: the Department of Chemical Process Engineering is developing the reformer and the sulphur trap, the Department of Thermal Processes is responsible for the downstream combustion unit and the heat exchanger, and the Analysis Department is performing specific tasks for the sulphur trap and will later perform measurements for the material balances in the plant. Together with our project partners, H.C. Starck, IEE, and IMET, we shall successfully complete this interdisciplinary project. (di)

Dr. rer. nat. T. Heere

DP Systems, Graphics, and Media Technology

Our department is one of the central service departments of CUTEC-Institute. That is, we perform our services for the operative departments and for the Management. We offer a wide range of functions, which include the solution of classical EDP problems for the final user as well as the maintenance and continuing development of the central DP infrastructure, on the one hand, as well as designing and printing of documents, graphics, or presentations in all forms, on the other hand. Moreover, events at our Institute are accompanied by our media technology, and CUTEC exhibits at industrial fairs, such as IFAT in April 2005, are organised and implemented. During the past year, the new Image Film was prepared, the Internet presentation was optically redesigned and the contents improved in cooperation with all departments, and a new firewall solution was introduced in operations. Last, but not least, CUTEC-News, including the issue which you are now reading, is published in our department as a part of our supplementary public relations work. (he)

Dipl.-Volksw. K.-R. Sommer

Commercial and Accounting Department

The Commercial and Accounting Department is more than just the management of money, accounting, and salary accounting. Within CUTEC, this department is the service sector which establishes, safeguards, and renders possible the general economic conditions for the work of the operative departments. In this department, the economic interests of CUTEC as a GmbH (company with limited liability) are viewed as an entirety. The department is situated at the crucial point between legal regulations, specifications of supporting institutions, and the requirements of the operative departments.

Besides financial / cash management and accounting, the Commercial and Accounting Department is also responsible for personnel management, internal services, material management and purchasing, as well as for the CUTEC library. The Commercial and Accounting Department intends to actively contribute to the development of business management with the continuing growth of CUTEC. (so)

Foreign markets: South America and Thailand

CUTEC at FIMAI in São Paulo, and a lecture tour in Thailand

In November 2004, CUTEC was represented by Mr Siemers at the FIMAI Industrial Fair in Brazil. This fair, which took place in São Paulo from 3rd to 5th November, is the largest annual environmental exposition in Latin America. The objective of the trip was to assess the situation on the Brazilian, or more generally South American, market with a view toward possibilities for cooperation. For this purpose, the Brazilian Chamber of Industry and Commerce organised so-called business meetings with support from the European Union. A number of discussions and contacts resulted, especially in the fields of polluted sites / soil remediation, waste water / sewage sludge problems, and renewable energy sources.

Enthusiastic discussion with a representative from a Brazilian university

Upon invitation by the Royal Thai Embassy in Berlin, Mr Siemers visited Thailand from 30th January to 12th February 2005. The topic of discussion was renewable energy sources. Thailand has an ambitious plan to increase the share of renewable energy sources from 0.5 per cent to 8 per cent prior to 2011 and hopes to benefit from German experience. For this purpose, a series of lectures have been presented, and specialised discussions have been conducted by a German expert group, in which Mr Siemers was responsible for the field of biomass utilisation. Thailand is viewed as a highly dynamic, growing market. Subsequently, the CUTEC concept was presented to a number of highly interested Thai institutions. Although the tour did not include the area destroyed by the Tsunami, effects of this natural disaster were perceptible in public life. (he/wes)

New Thermal Exhaust Gas Purification Technology with Regenerative Exhaust Air Preheating for Exhaust Gases which Contain Organosilicon Compounds

For numerous industrial processes (for instance, regranulation of plastics, plastics compounding, coating processes, MBA plants) a serious problem involves the treatment or disposal of exhaust air or exhaust gases which contain organosilicon compounds, in addition to other volatile organic compounds.

In many of such cases, sorptive, biological, or catalytic exhaust-gas purification methods are out of the question because of the wide variety of substances present. Of course, thermal exhaust-gas or exhaust-air purification with recuperative exhaust air preheating is expedient as far as the purification efficiency (complete combustion) is concerned, but not with respect to the high primary energy consumption. From an ecological and economic standpoint (low content of residual pollutants, low fuel consumption), thermal exhaust-gas purification with regenerative exhaust-air preheating is predestined for such applications because of the extremely high level of exhaust-air preheating.

LTB pilot plant in operation at CUTEC

On the other hand, however, the regenerator material, which is usually of monolithic structure, becomes contaminated and thus plugged by adhesion of the amorphous oxidation product (predominantly SiO_2) from the organosilicon compounds. Cleaning of the material is feasible only by manual removal, steam-jet cleaning of the individual monolithic structures, and re-insertion. As far as the working conditions and the necessary effort are concerned, however, this approach is not practicable.

The objective of a current project supported by the Deutsche Bundesstiftung Umwelt (DBU) is the development of a process which allows nearly complete separation of the SiO_2 dust as well as the avoidance of the aforementioned operational problems.

The essential feature of the new technological approach is the use of ceramic spheres as regenerator material. By virtue of their particle size and mechanical stability, these spheres can be automatically withdrawn if the pressure drop exceeds a specified maximum, decontaminated by means of an appropriate separating device, and then returned to the plant.

During the pilot phase of the project, a mobile pilot plant (see figure) is constructed and then put into operation on the premises of potential users. In the course of this investigation, special attention is paid to the oxidation behaviour of the organosilicon compounds and to the system behaviour, for the purpose of designing a plant on an industrial scale (demonstration phase). (ne)

Project partners:

- Lufttechnik Bayreuth GmbH & Co. KG (original equipment manufacturer), Goldkronach
- ALBIS Plastic GmbH (plastics compounder), Hamburg

Dubai – Gateway to the Arabian market

CUTEC presents its innovations at the "Big5 Show"

Since time immemorial, Dubai has been the commercial centre of the Arabian world. In contrast to the usual clichés, however, money is earned by trade, rather than oil, in the Emirate of Dubai. Thus, the country has developed into a "boom town" among the United Arabian Emirates (UAE), and this development is reflected by numerous construction projects and irrigated (with recycled waste water) green areas in the middle of the desert, among other features.

CUTEC with "small team" on location Dr. Onyeche (l.) and Dipl.-Ing. Schäfer

On the basis of existing contacts in Bahrain and Doha, CUTEC was present for the first time at the Big5 Show in Dubai in December 2004. It was an opportunity for CUTEC to survey the situation on location, to demonstrate its potential, and to extend its international action radius under the leadership of Dr. Onyeche.

At the fair, companies concerned with all aspects of construction presented their exhibits to an international public from the Arabian and Asian worlds.

A building can ultimately be regarded as a balance area, too, and since many people have become aware of this fact, the CUTEC stand attracted many visitors.

Visitors learning about the new CUTEC technologies

Furthermore, the problem of ensuring an adequate supply of drinking water and energy will be shared by many countries in the future, not only the UAE.

In view of these problems, further contacts have been successfully established, and existing contacts have been intensified. (schä)

CUTEC cooperation with Haute Normandie in France

2nd German-French Workshop on „Renewable Energy Sources“

Within the scope of the partnership between the German Federal State of Lower Saxony and Haute Normandie in France, the 2nd German-French Workshop, “Renewable Energy Sources”, took place at CUTEC on 9th and 10th December 2004.

Meeting-place CUTEC (from left): Prof. Carlowitz (CUTEC), Secretary of State Dr. Eberl (Ministry of the Environment in Lower Saxony), Prof. von Weizsäcker (MdB Berlin), and Prof. Heins (CUTEC

During this event, the exchange and sharing of experience already in progress with the French scientists has been continued. In this context, the utilisation of biofuels, chances and possibilities of fuel cell technology, as well as coupling and controlling of renewable energy sources were considered, in addition to various questions concerning the use of wind turbines for electric power generation. Participants in the workshop included the Universities of Le Havre, Oldenburg, and Clausthal, research institutions in Rouen and Fécamp, as well as CUTEC.

The public was invited to attend the guest lecture presented by Prof. Dr. Ernst-Ulrich von Weizsäcker, Chairman of the Environmental Board of the Deutscher Bundestag (German Parliament). As a well-known pioneer for “Factor Four”, the environmental politologist initiated a lively discussion after his engaged talk on “Ecological Reorientation of Technical Progress”.

With the welcoming address by the Secretary of State, Dr. Christian Eberl, the Ministry of the Environment in Lower Saxony, which provided financial support for the workshop, once again emphasised its interest in the development of innovative technology in the field of “renewable energy sources”.

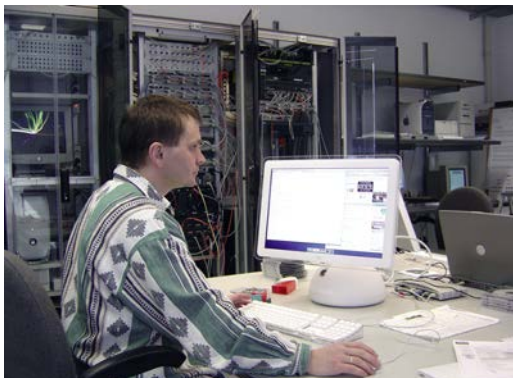
With the research institutions in Le Havre and Fécamp, CUTEC has signed a cooperative agreement with the intention of submitting joint research proposals on the EU level. Further objectives include exchange programs for scientists as well as the enhancement of technology transfer. Plans for the 3rd workshop, to be held in France this year, have already been finalised. (kra)

DP Systems, Graphics, and Media Technology

Admittedly, the department name sounds awkward and is somewhat reminiscent of a general store. Nevertheless, the designation of this department is justified, since we provide internal services to the operative departments in more than just a single field. A feature common to all jobs in the department is the fact that the computer is of central importance in the accomplishment of our daily tasks in one way or another. Within the department, the following services are offered for assisting the scientists: The DP Systems Division provides user support and solutions to everyday problems with hardware and software, as well as maintenance and continuing development of DP infrastructures and of central components, by means of which services such as internet access, E-mail, or databases are made available to all.

Creative work is performed at the graphics work stations: Logos are designed here, layouts are generated for posters and all forms of print media, presentations are conceived, and advertising materials are prepared. Daily business also includes processing and printing of all types of graphics, digital photographs, and documents. If larger quantities or special formats are required, the document is first prepared for printing and then forwarded to a printing house.

Screenshot of CUTEC’s web presentation



View of the CUTEC computer centre – the heartbeat of the EDP Division

Media Technology operates primarily in the studio and in the main auditorium, which is currently being converted to a multimedial auditorium in cooperation with the Technical University of Clausthal. Internal services include media-technical support for events at CUTEC, photographic or motion-picture documentation of new plants and facilities, or those under construction, as well as the preparation of motion pictures taken by staff members during plant operation outside of CUTEC. To a limited extent, public relations services are also performed by this department, although this aspect of our work has not yet been anchored in the department name. Besides issuance of the official CUTEC publication series, preparation of CUTEC-News, and designing of the Institute’s internet presentation, our services also include the organisation and implementation of CUTEC exhibits at industrial fairs at home and abroad. For instance, we were present with our own stand at IFAT München in April and shared a stand at the exhibition of the Deutsche Bundesstiftung Umwelt (DBU) (German Environmental Foundation).

(he)

SOFC system demonstrator for decentralised energy supply

In this project, CUTEC-Institut GmbH in Clausthal-Zellerfeld, H. C. Starck in Goslar, and the Technical University of Clausthal with the Institute of Metallurgy (IMET) as well as the Institute of Electrical Power Engineering (IEE) are developing a system demonstrator for indicating the opportunities of decentralised electric power and heat supply with the use of commercial propane gas in a high-temperature fuel cell (SOFC).

The so-called demonstrator (see figure below) consists of six main components: a unit for the removal of sulphur compounds (sulphur trap), a pre-reformer whose function includes the prevention of carbon formation in the SOFC (reformer), a planar SOFC stack, including electrical and gas connections, as well as components for downstream thermal combustion (TNV), heating, and conditioning of the electric power thus generated.

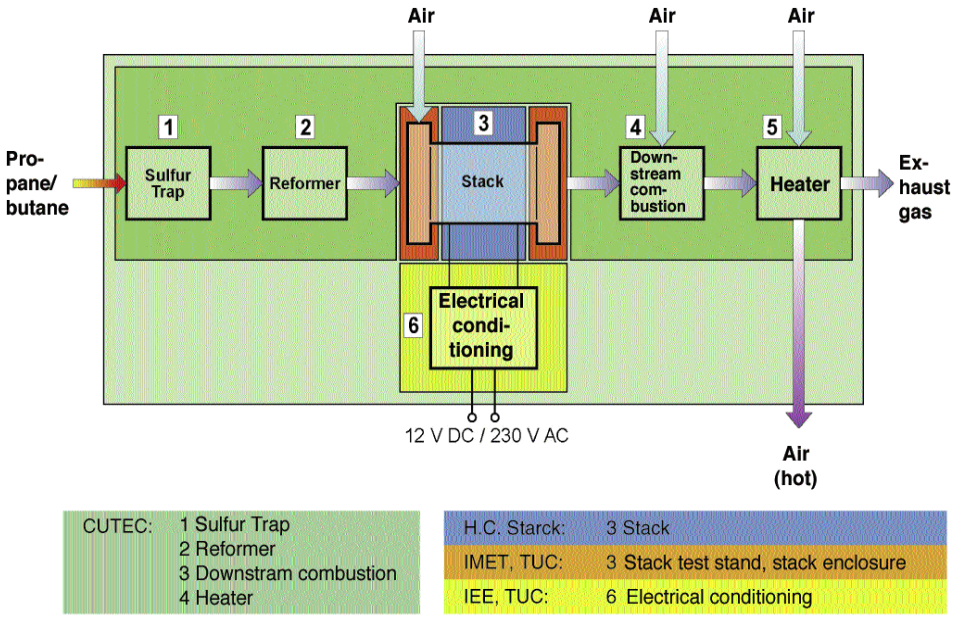
Besides the development of technology, the participants in the project will employ the demonstrator as an acquisition instrument for future system manufacturers, with the aim of supporting the introduction of SOFC technology on the market for decentralised power supply equipment. The planned demonstrator should satisfy the following requirements:

- ❏ APU (auxiliary power unit) with an average electric power output of about 1 kW and additional heating power for space-heating, with the option of selecting any of 3 functional stages:
  a. simultaneous generation of electric power and heat
  b. exclusive generation of electric power
  c. exclusive generation of heat
- ❏ Use of commercial liquefied petroleum gas (propane / butane) as fuel, as frequently employed in decentralised space-heating applications
- ❏ No need for a water connection, and thus only an air intake, in addition to the liquefied petroleum gas

The following tasks are assigned to the various project partners:
CUTEC is in charge of designing the overall system and the peripheral technology, as well as the development of the sulphur trap, the reformer, and the downstream combustion unit.

The Institute of Metallurgy is responsible for the design and operation of an SOFC stack test stand for determining the operating conditions and relevant process parameters for the demonstrator.

The Institute of Electrical Power Engineering is responsible for the electrical conditioning and the operational control equipment.
H. C. Starck will provide a new generation of SOFC stacks for decentralised power supply.
The project partners will jointly design, construct, and operate the prototype. Furthermore, the results of the project will be employed for designing a compact system, for the acquisition of system integrators, and for the introduction on the market.
The project will run until March 2007 and is funded by the German Federal State of Lower Saxony. (di)



Example: Components of the SOFC demonstrator for liquefied petroleum gas

IMPRINT

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In particular, all who sent us their words of congratulation deserve special thanks: Prime Minister Wulff of Lower Saxony, Prof. Adeniran, Prof. Beck, Prof. Brandt, Mr Martin, as well as Mrs Gerda Vollbrecht for the insight into the history of CUTEC.

New in the CUTEC Team

Dr. Axel Fischer, new Head of the Chemical Analysis Department

On 1st December 2004, Dr. rer. nat. Axel Fischer became Head of the Chemical Analysis Department. He thus succeeds Dr. rer. nat. Klaus Schrickel, who has assumed a post in industry. Dr. Fischer studied chemistry at the Technical University of Braunschweig and completed his doctoral dissertation on the topic of "Synthesis and Crystallographic Structural Analysis of Heterocyclic Compounds Containing Phosphorus". At the same time, he completed several semesters of continuing education in the economic sciences. From 1991 to 1997, he was employed in a scientific capacity in industry and at various research institutes – at Harvard University among others. Subsequently, he assumed a post as head of the X-Ray Structural Analytical Laboratory at the Otto von Guericke University in Magdeburg.

Dr. Axel Fischer (left) and Mr. Michael Niedermeiser

Since 1st December 2004, Dipl.-Ing. (FH) Michael Niedermeiser has been employed at the Department of Physical and Biological Processes. Mr Niedermeiser completed his studies in electrical engineering at the University of Applied Sciences for Economics and Engineering in Berlin, with special emphasis on process automation. After his studies, he was employed as a project engineer at AUCOTEAM GmbH in Berlin. At CUTEC, Mr Niedermeiser will be responsible for sensor development and validation in sludge flocculation.

Dipl.-Inf. S. Harneit

After completing a course of study in computer science at the Technical University of Clausthal, Dipl.-Inf . Steffen Harneit began his work at the Department of Modelling and Simulation on 1st November 2004, where he is responsible for the project, "Humanitarian Mine-Sweeping" (he/wes)

Scientific Advisory Board at CUTEC:

Prof. Dr.-Ing. Günter: A personal profile

Prof. Dr.-Ing. Günter Borchardt

Prof. Dr.-Ing. Günter Borchardt is the leader of the working group, Thermochemistry and Microkinetics, at the Institute of Metallurgy at the Technical University of Clausthal. Since the completion of his studies at the Technical University of Clausthal (Diplom in metallurgy in 1968, doctorate in 1971, habilitation in 1978), his primary interest has been devoted to atomic transport processes in high-temperature materials, with special focus on functional materials, including those employed for high-temperature fuel cells. The work performed by his group is supported by public funds (DFG, BMBF, EU, Volkswagen Foundation, ...) and in conjunction with industrial projects. He has cooperated more closely as a project partner at CUTEC-Institut within the scope of the Fuel Cell Initiative in Lower Saxony since the beginning of 2004.

He was appointed to the Scientific Advisory Board upon proposal by the Board of Directors of the Technical University of Clausthal in 2003. Among the long-term objectives of CUTEC-Institut, he has focused special attention on work in the field of renewable energy sources with the application of efficient energy conversion technology. Besides his counseling function in the Advisory Board, his essential duty, in his opinion, is to promote the concentration of competence in the field of electrochemical energy conversion at Clausthal, and to assist CUTEC-Institut in making this technology accessible to the industry. (he)

The Workers' Council, too, is celebrating a small anniversary of its own

Only two years after the establishment of CUTEC-Institut GmbH, an employee representation was also constituted for the first time at the still-young company. Thus, the Workers' Council has formed an integral part of CUTEC for thirteen years. As is the case with every newly created tool, this organisation, too, had to prove its worth throughout the years. This representative body has now existed for four legislative periods and has gradually evolved into a supporting pillar for the staff.

Besides its usual functions in maintaining the rights of the employees with respect to the Management, the Workers' Council is actively engaged in the continuing development of the Institute. In company agreements and documented working agreements with the Management, an environment of constructive and confident cooperation can be and is established and extended between the two sides. The offer to the Management, to accompany and actively enhance personnel development, is only one key word among others. We extend our sincere good wishes to the Institute on the way to a successful future, in combination with the hope of creating additional jobs and trainees. (cro)